



1 : 240

Country : USA							
Field : Wattenberg							
Location : Lat: 40° 44' 32.85" North Long: 104° 1' 11.45" West							
Well : Ptasnik Federal LC19-74HN							
Company : Noble Energy							
Rig : H&P 322							
LOCATION		Other Services					
Latitude : 40° 44' 32.85" North Longitude : 104° 1' 11.45" West UTM Easting = 3410136.316 ft UTM Northing = 1516745.374 ft		Directional Drilling					
Permanent Datum : Ground Level		Elev. KB N/A					
Log Measured From : Drill Floor		24.00 ft Above Permanent Datum DF 5029.00 ft					
Drilling Measured From : Drill Floor		MD LOG GL 5005.00 ft					
		WD N/A					
Depth Logged : 762.00 ft To 10,590.00 ft		Unit No. : 11210425					
Date Logged : 03-Jan-13 To 08-Jan-13		Job No. : CA-XX-0900067303					
Total Depth MD : 10,590.00 ft TVD: 6,275.78 ft		Plot Type : Final					
Spud Date : 02-Jan-13		Plot Date : 09-Jan-13					
Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)			
	Size	From		To	Size	From	To
	2	8.750 in		762.00 ft	5,542.00 ft		
	3	8.750 in		5,542.00 ft	6,678.00 ft		
	4	6.125 in		6,678.00 ft	10,590.00 ft		
			Size	Casing Record (MD)			
				Weight	From	To	
				9.625 in	36.00 lbpf	SURFACE	752.00 ft
				7.000 in	24.00 lbpf	SURFACE	6,671.00 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	04-Jan-13	05-Jan-13	08-Jan-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	762.00	5,542.00	6,678.00		
Log End Depth (MD, ft)	5,542.00	6,678.00	10,590.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	03-Jan-13 14:45	04-Jan-13 16:00	06-Jan-13 18:00		
Drill/Wipe End Date and Time	04-Jan-13 07:30	05-Jan-13 07:45	08-Jan-13 11:00		
Min Inc (deg) @ Depth (MD, ft)	.18 @ 5,181.00	.92 @ 5,552.00	86.80 @ 6,758.00		
Max Inc (deg) @ Depth (MD, ft)	14.98 @ 2,616.00	80.18 @ 6,621.00	91.42 @ 9,796.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC	.64 / PDC		
Flow Rate (gpm)	595.00	595.00	270.00		
Max AV (fpm) / CV (fpm) @ MWD	477.1 / 477.1	477.1 / 477.1	436.9 / 436.9		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.45 / 28.00	9.50 / 37.00	10.00 / 34.00		
Filtrate CL (ppm)	650.00	650.00	650.00		
pH / Fluid Loss (mptm)	11.50 / N/A	9.50 / N/A	9.50 / N/A		
PV (cP) / YP (lbf2)	1 / 3.00	8 / 7.00	8 / 7.00		
% Solids / % Sand	1 / 0.05	4.7 / 0.25	7.5 / 0.20		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Min Tool Temp (deg F) / S	444.78 / PGM	428.89 / PGM	334.89 / PGM		

Max Tool Temp (degF) / Source	141.70 / PCM	160.83 / PCM	221.80 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Robert Ley	Robert Ley	Robert Ley		
Customer Representative	Jeremy Stolz	Jeremy Stolz	Jeremy Stolz		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11341341	11341341	11672158		
Insert Serial Number	11680785	11680785	10744810		
Date and Time Initialized	02-Jan-13 15:12	01-Jan-70 00:00	05-Jan-13 15:27		
Date and Time Read	05-Jan-13 14:06	05-Jan-13 14:00	08-Jan-13 20:51		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	57.00	57.00	54.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341341	11341341	11672158		
Sonde Serial Number	11833258	11833258	10835184		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	160.00	277.34	204.43		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.19	49.75	47.22		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341341	11341341	11672158		
Insert/Sonde Serial Number	11293270	11293270	11293280		

REMARKS

1. All depths are measured depths and are calibrated to the driller' pipe tally and are measured from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The Following smoothing parameters have been applied to the data"

PGRC (Gamma Ray Corrected):

Interval Resolution: 0.5 feet
Coercion Distance: 0.6 feet
Gap Fill: 3.0 feet

ROPA (Rate of Penetration):

Interval Resolution: 0.5 feet
Coercion Distance: 1.2 feet
Gap Fill: 3.0 feet

Insite Version 7.3.40 build 25

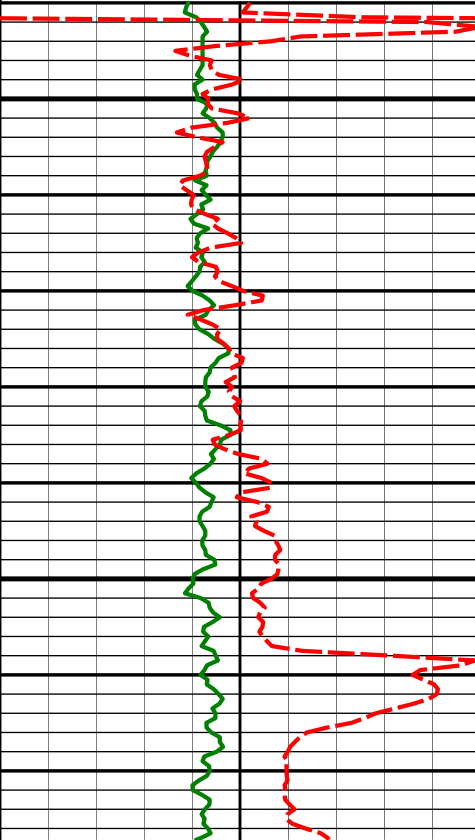
5. Survey at TD is projected to the bit

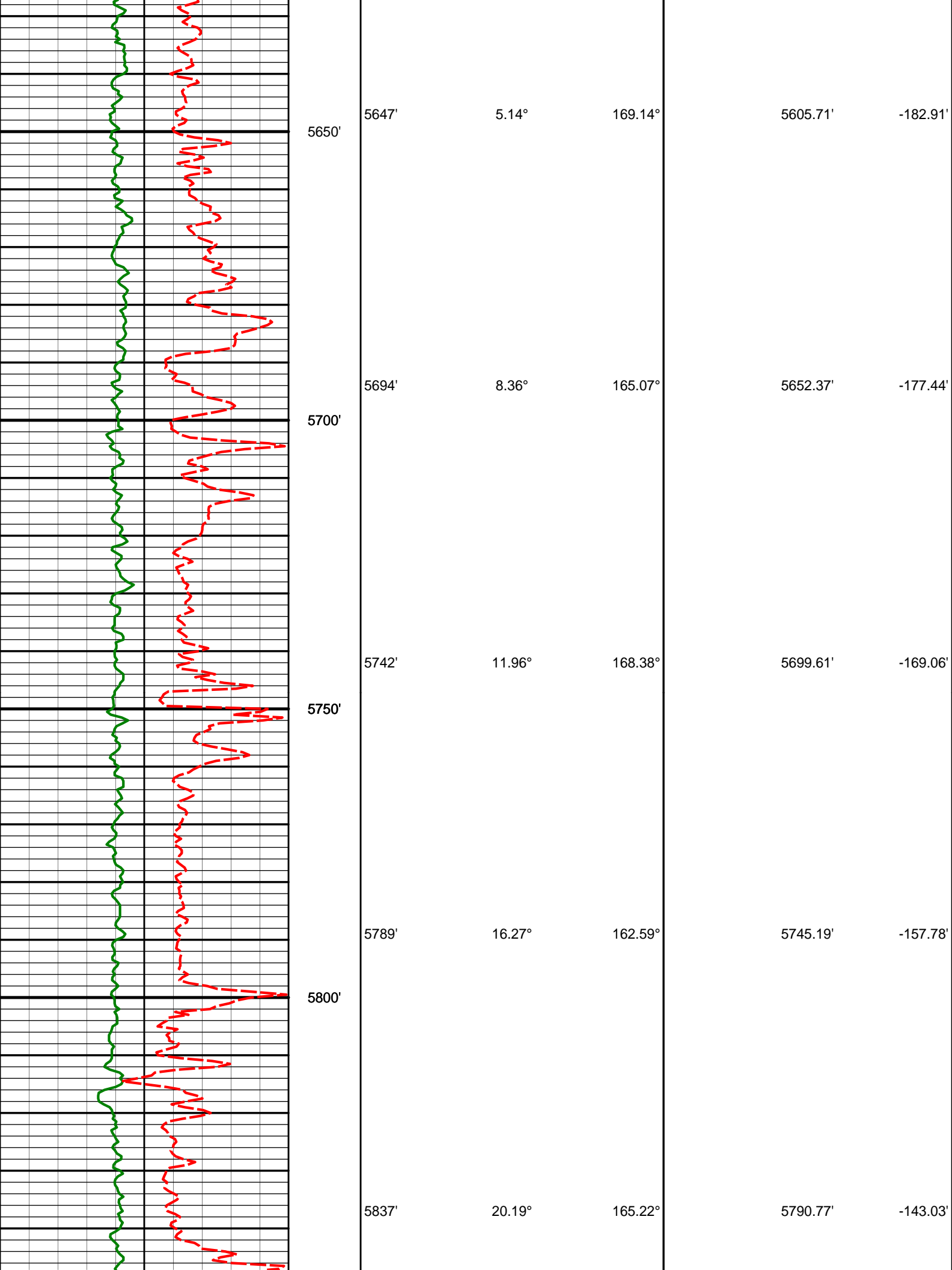
WARRANTY

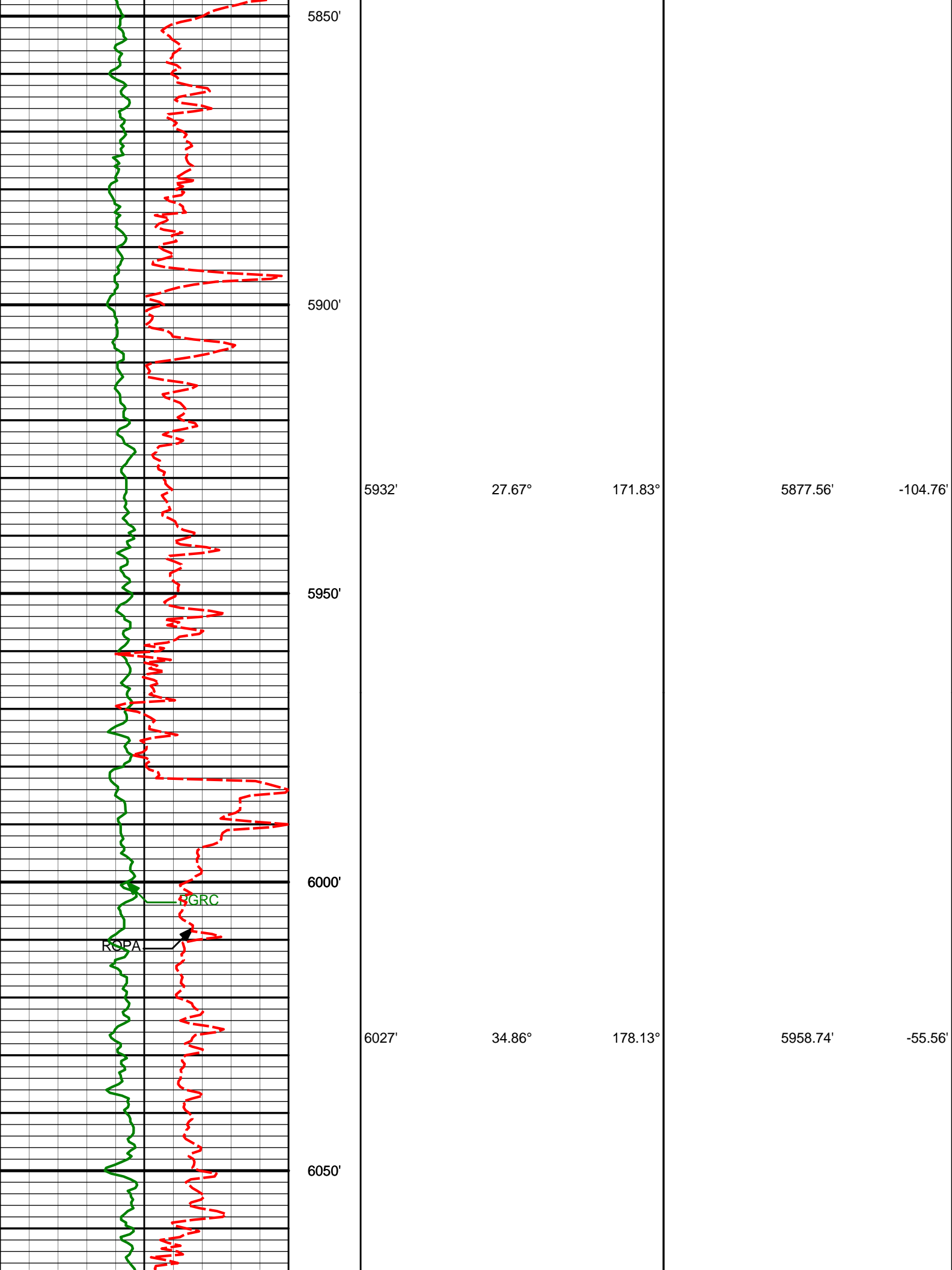
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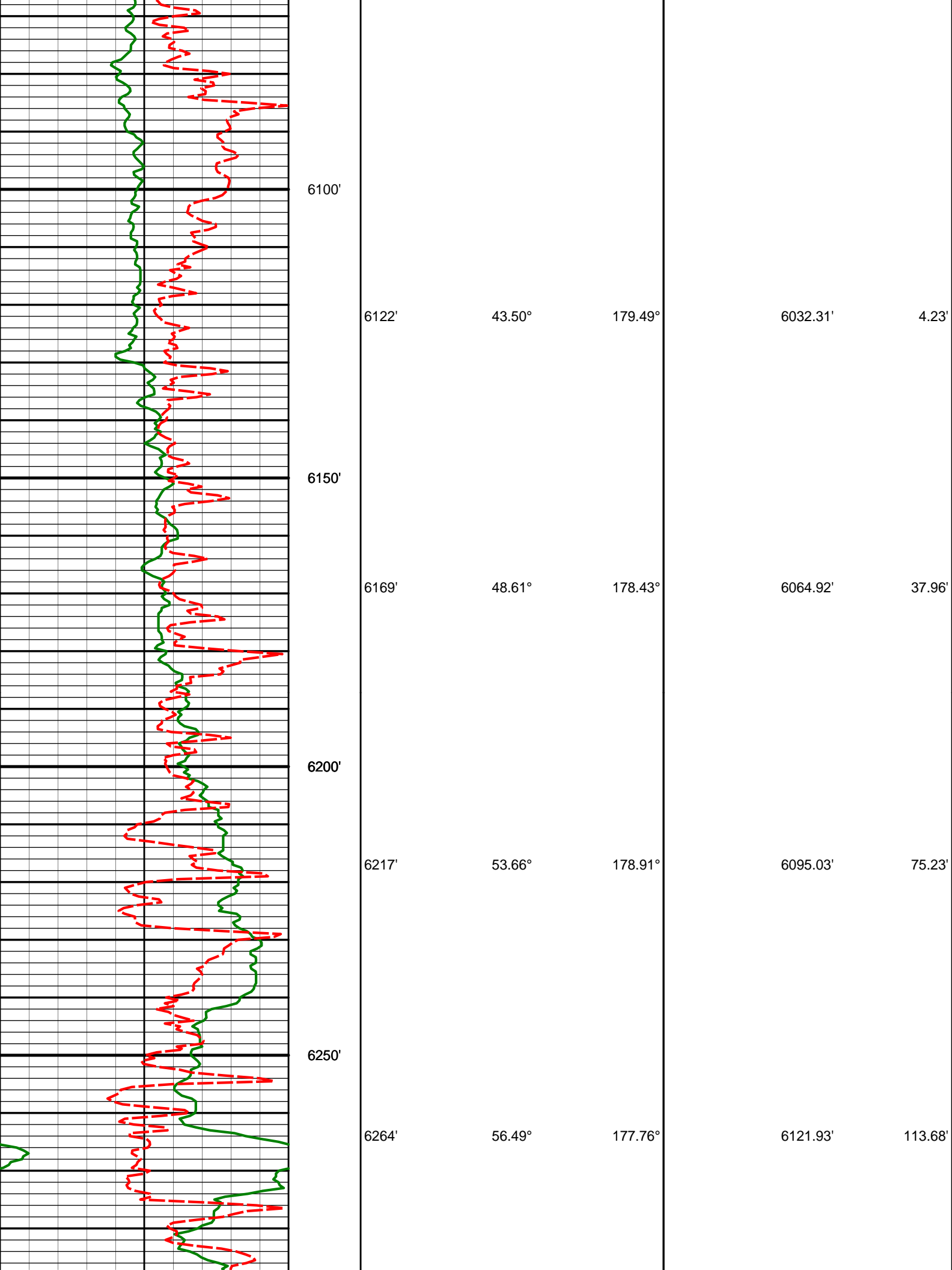
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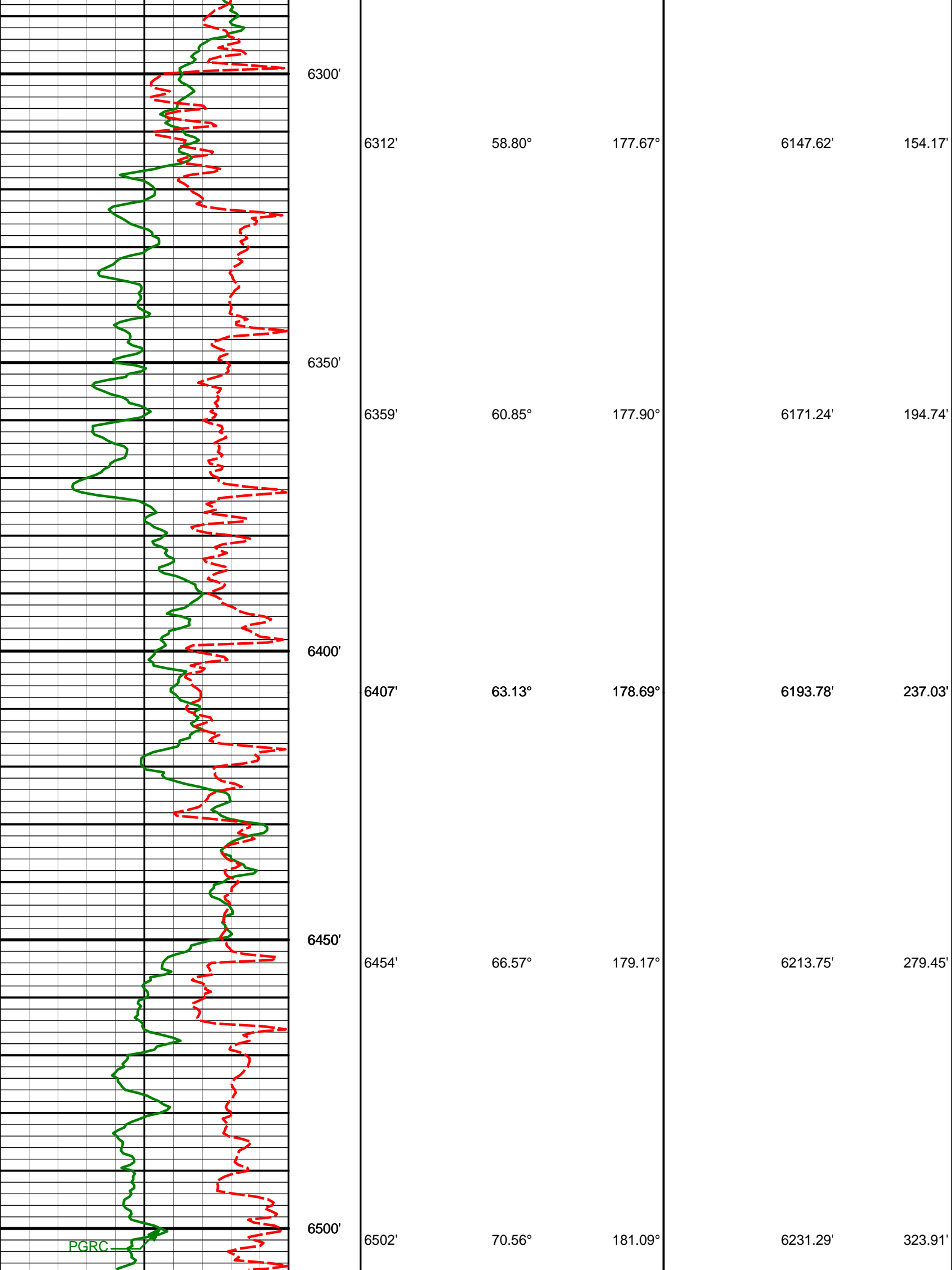
MD Detail Log 1:240

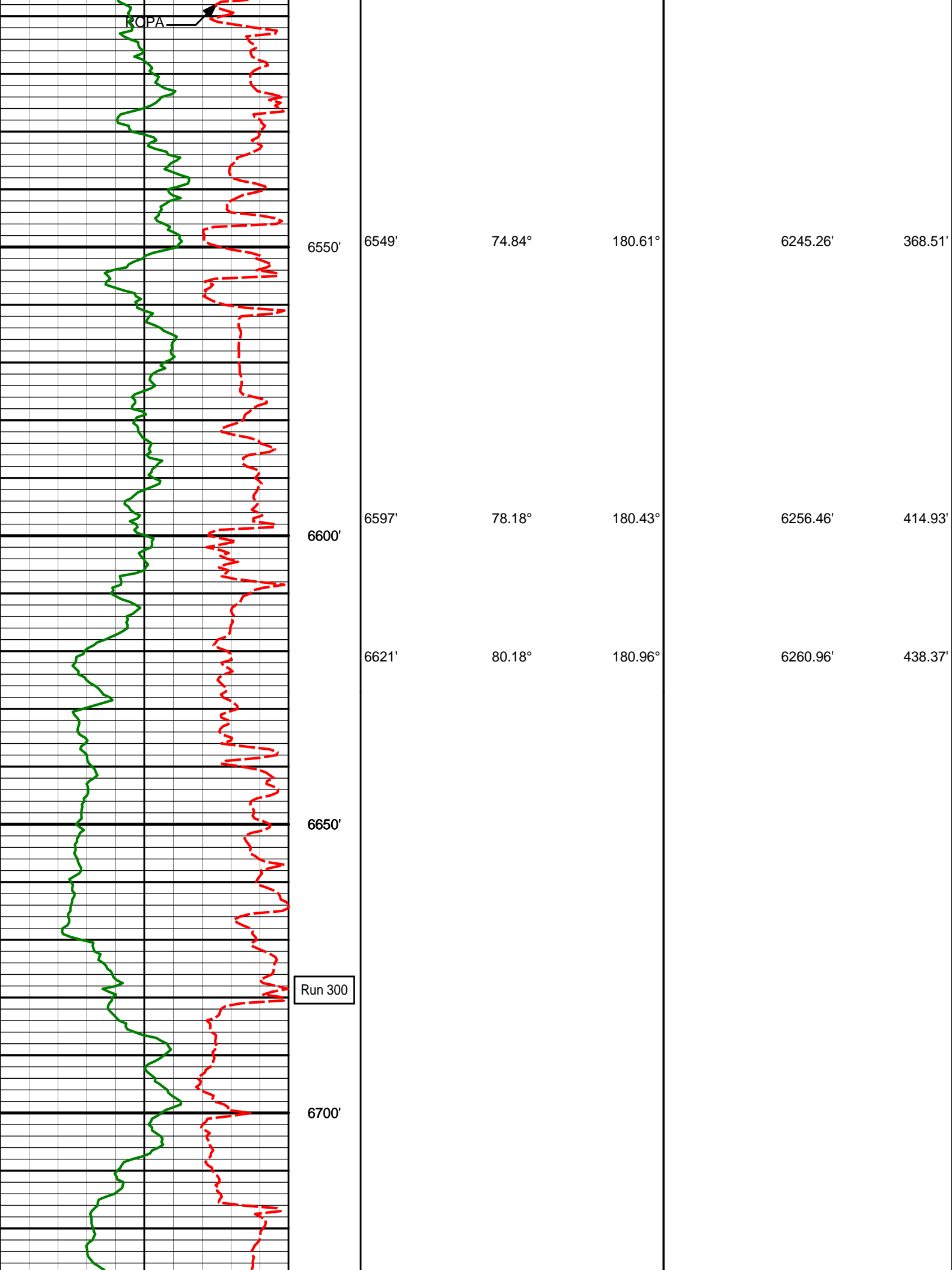
Gamma Ray (PGRC) (Api)						
0300		Feet				
6000			Depth	Inc	Azm	TVDVsec
		Run 200				
		5550'	5552'	0.92°	22.82°	5510.82'-186.48'
		5600'				
		KOP				

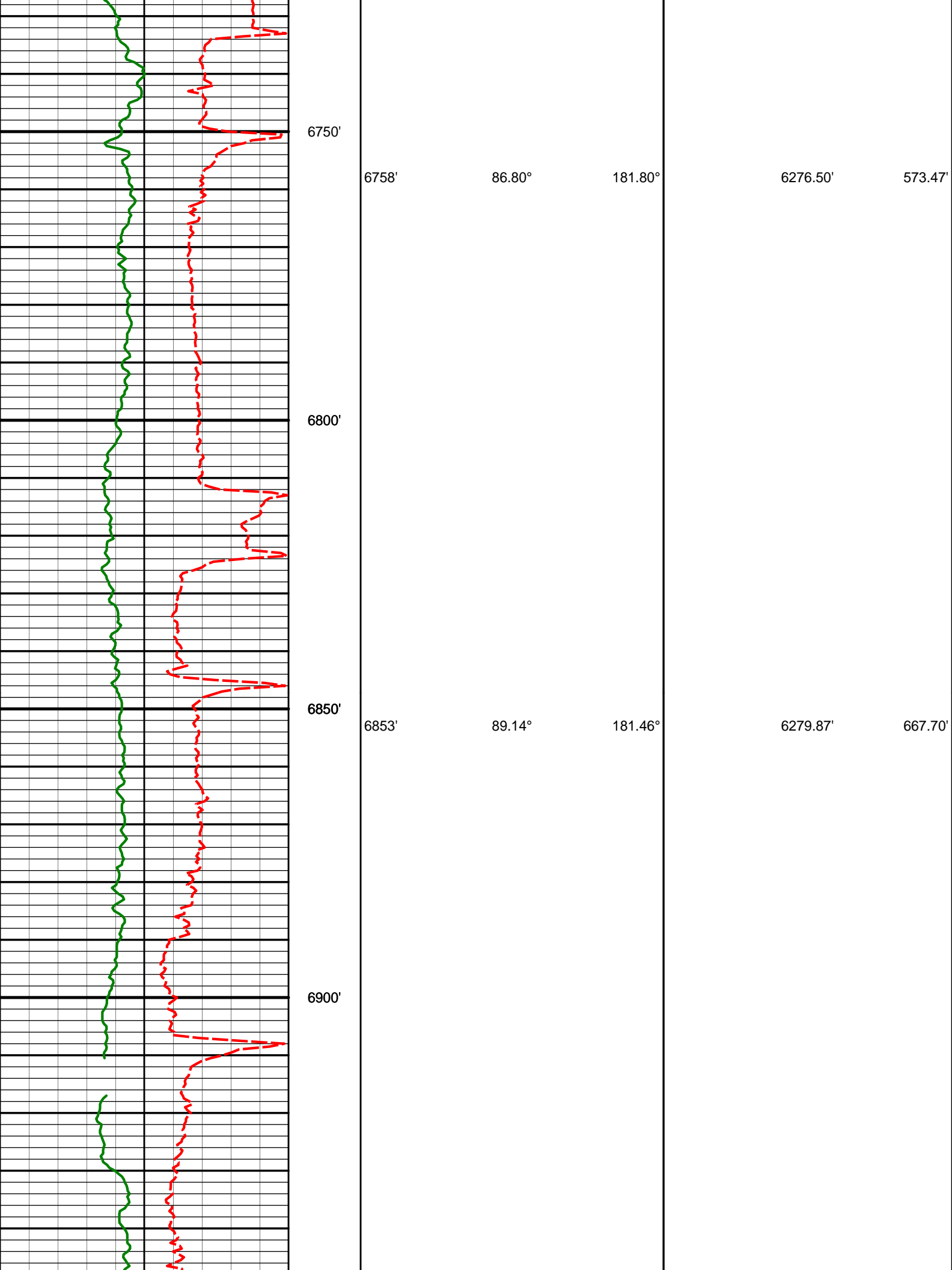


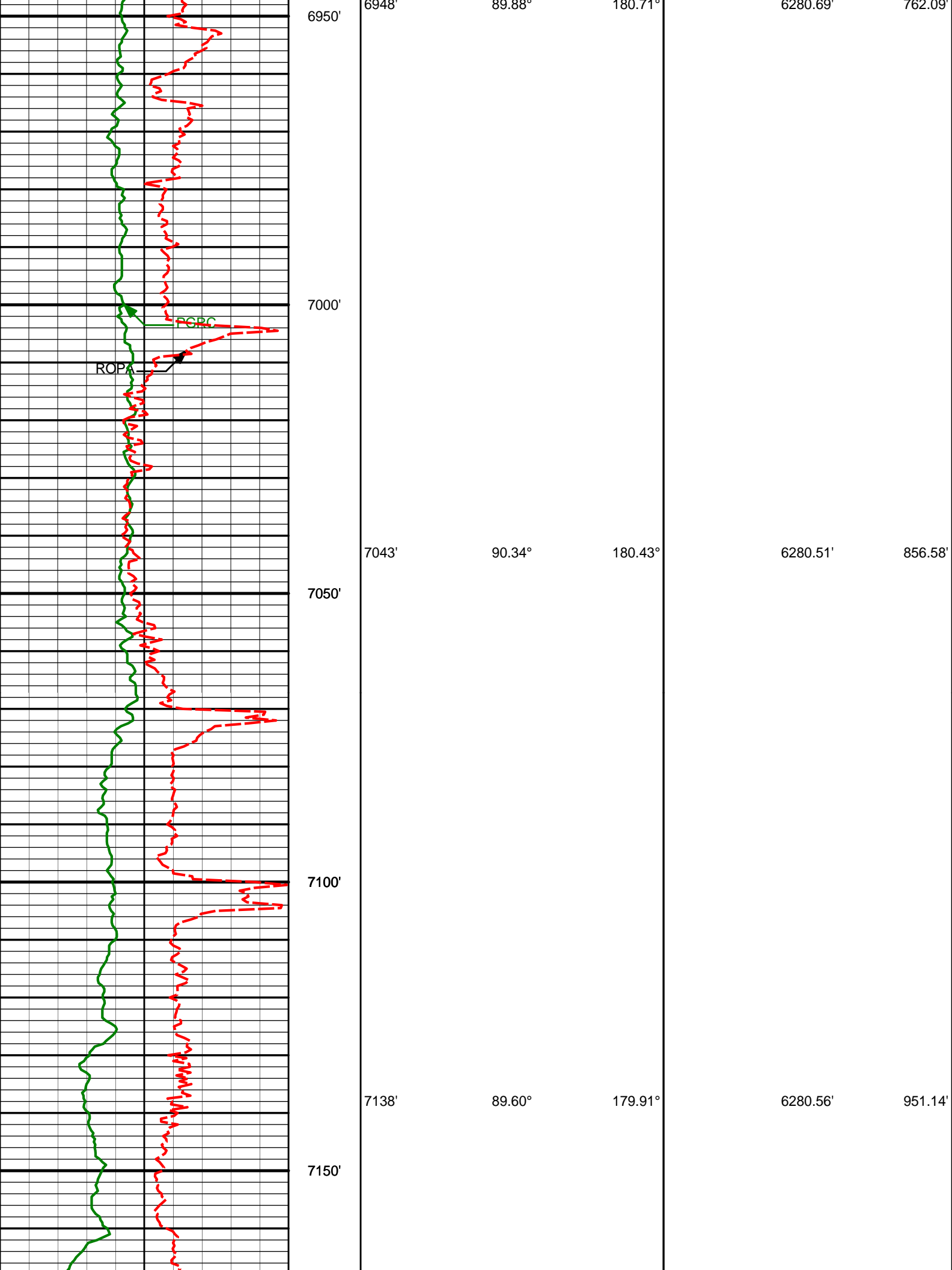


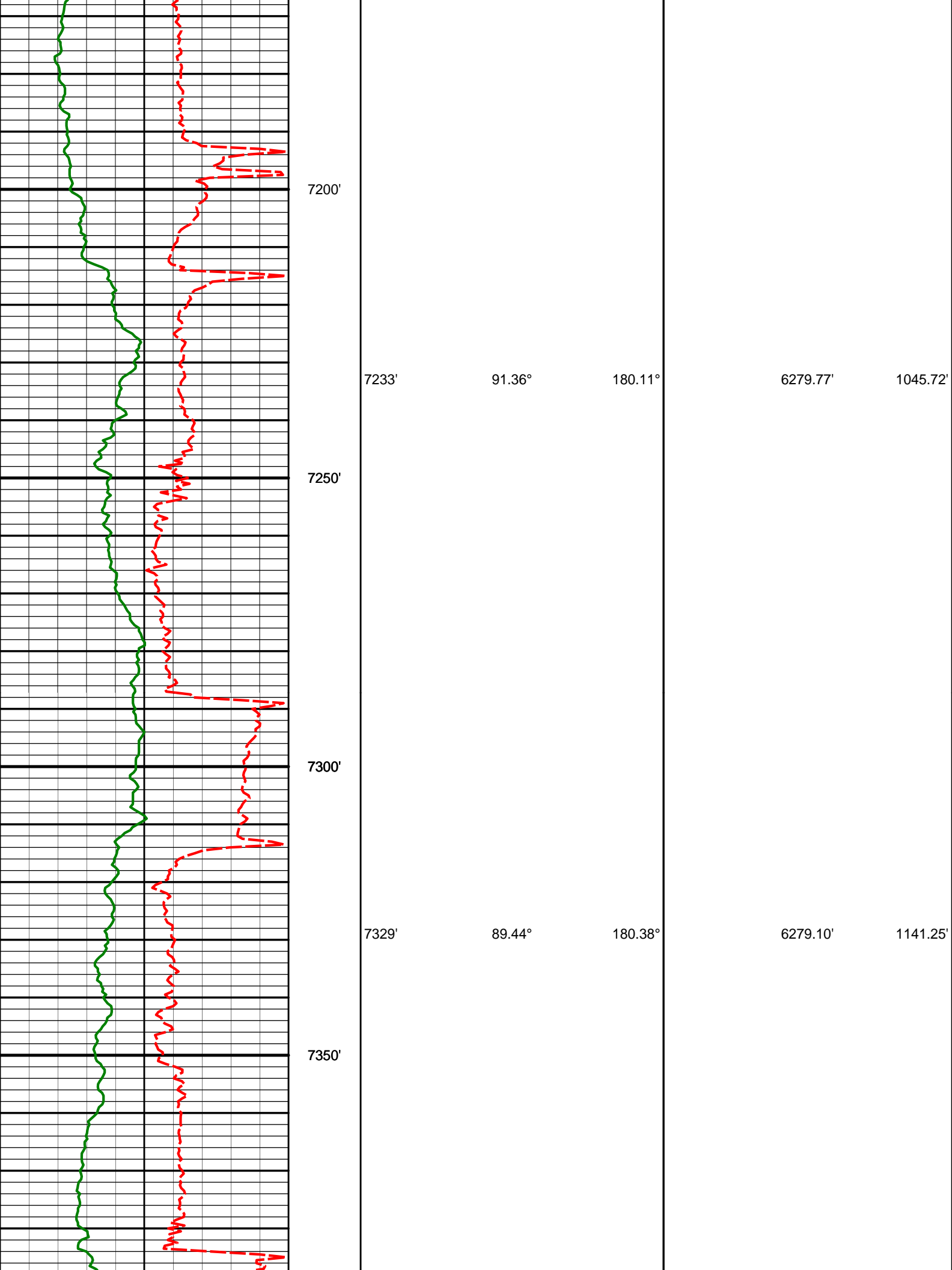


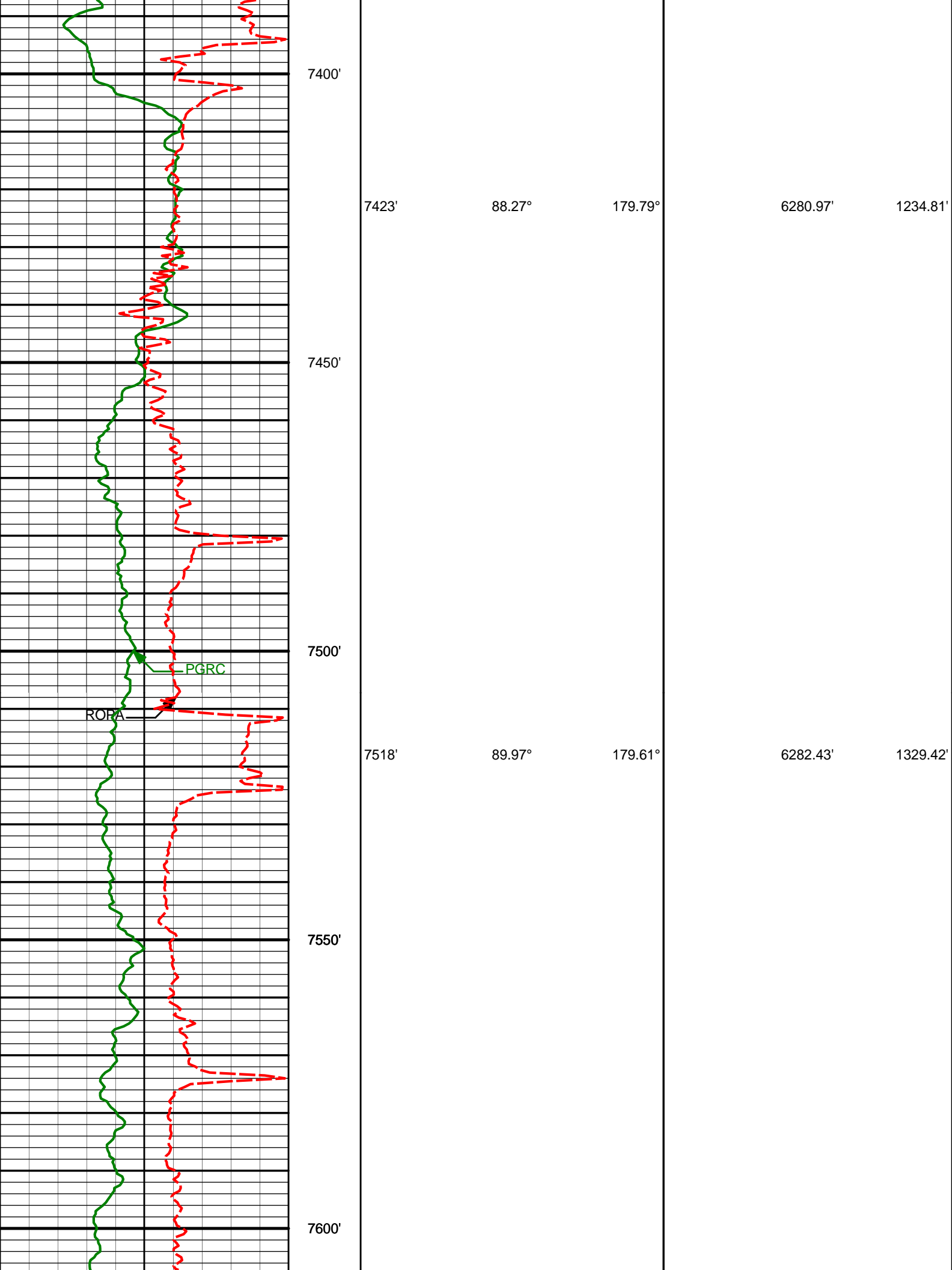


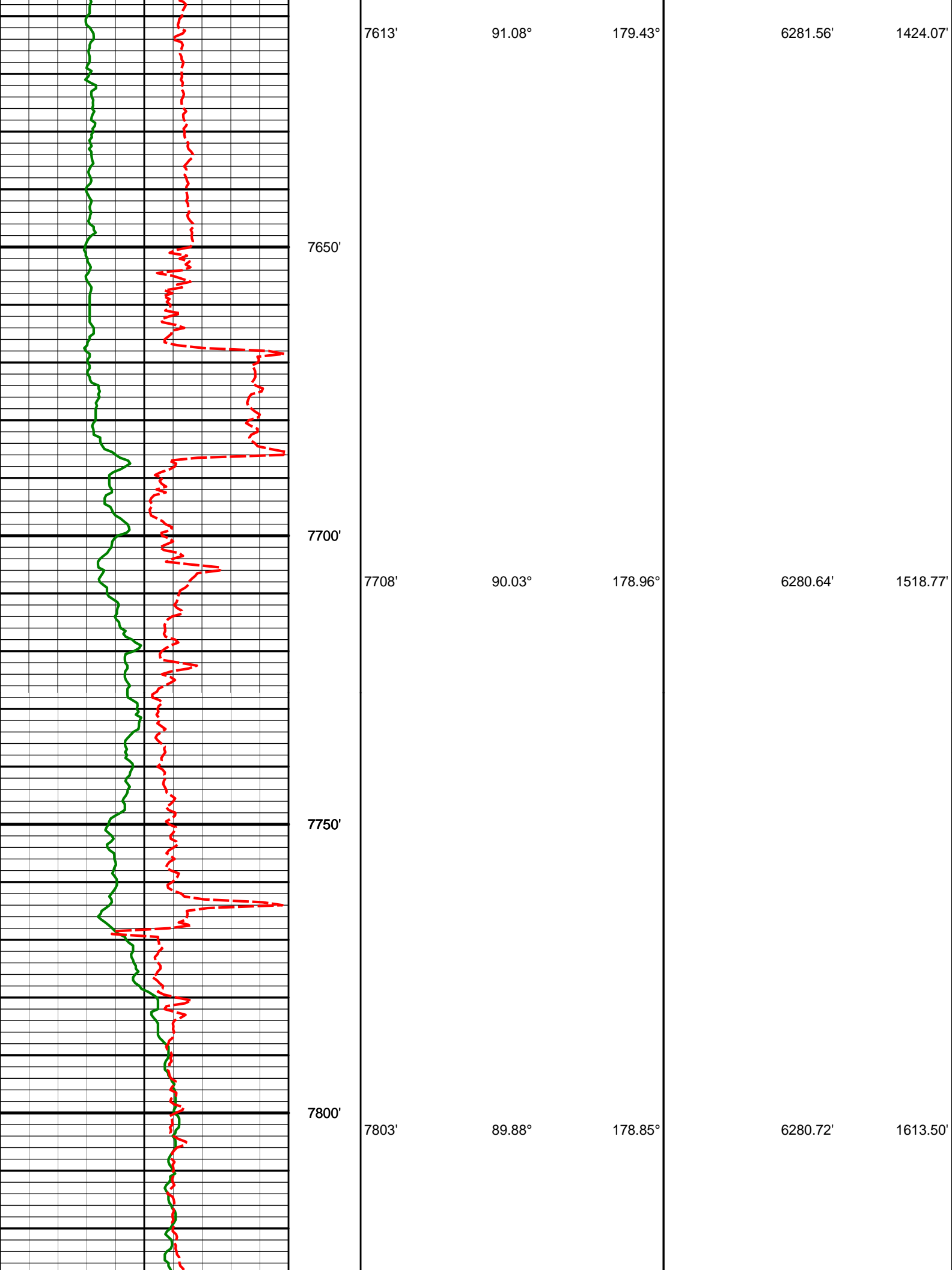


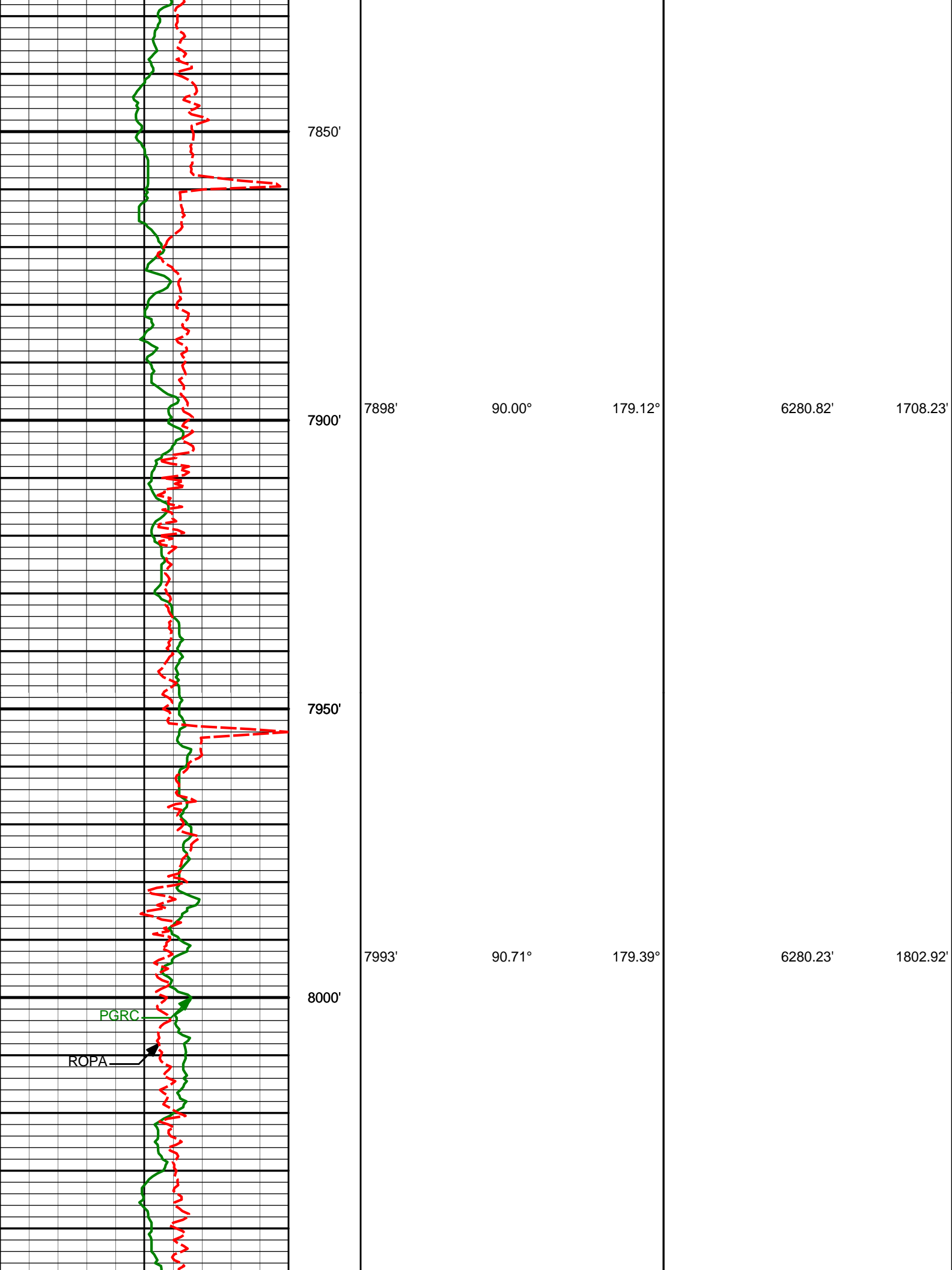


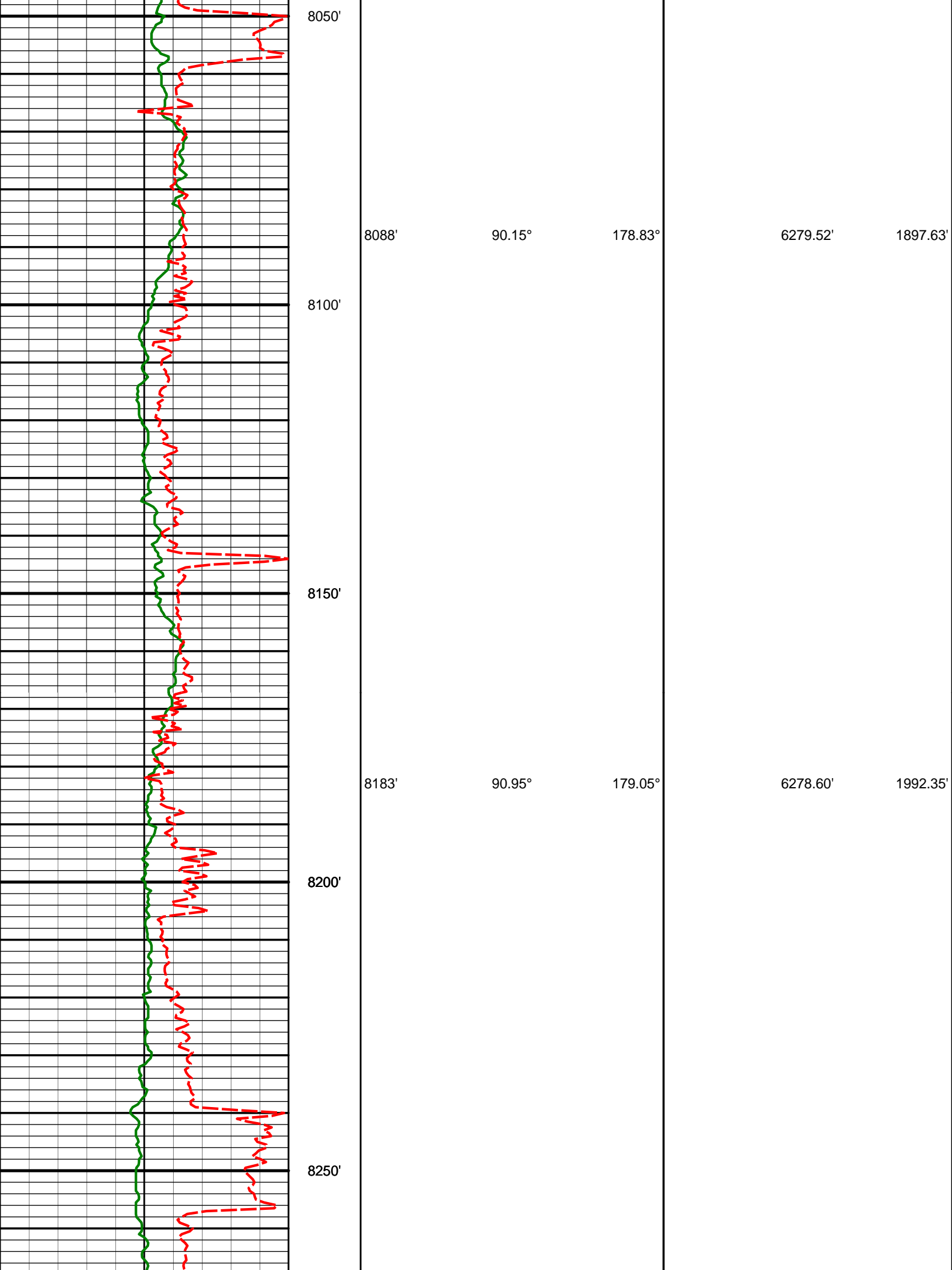


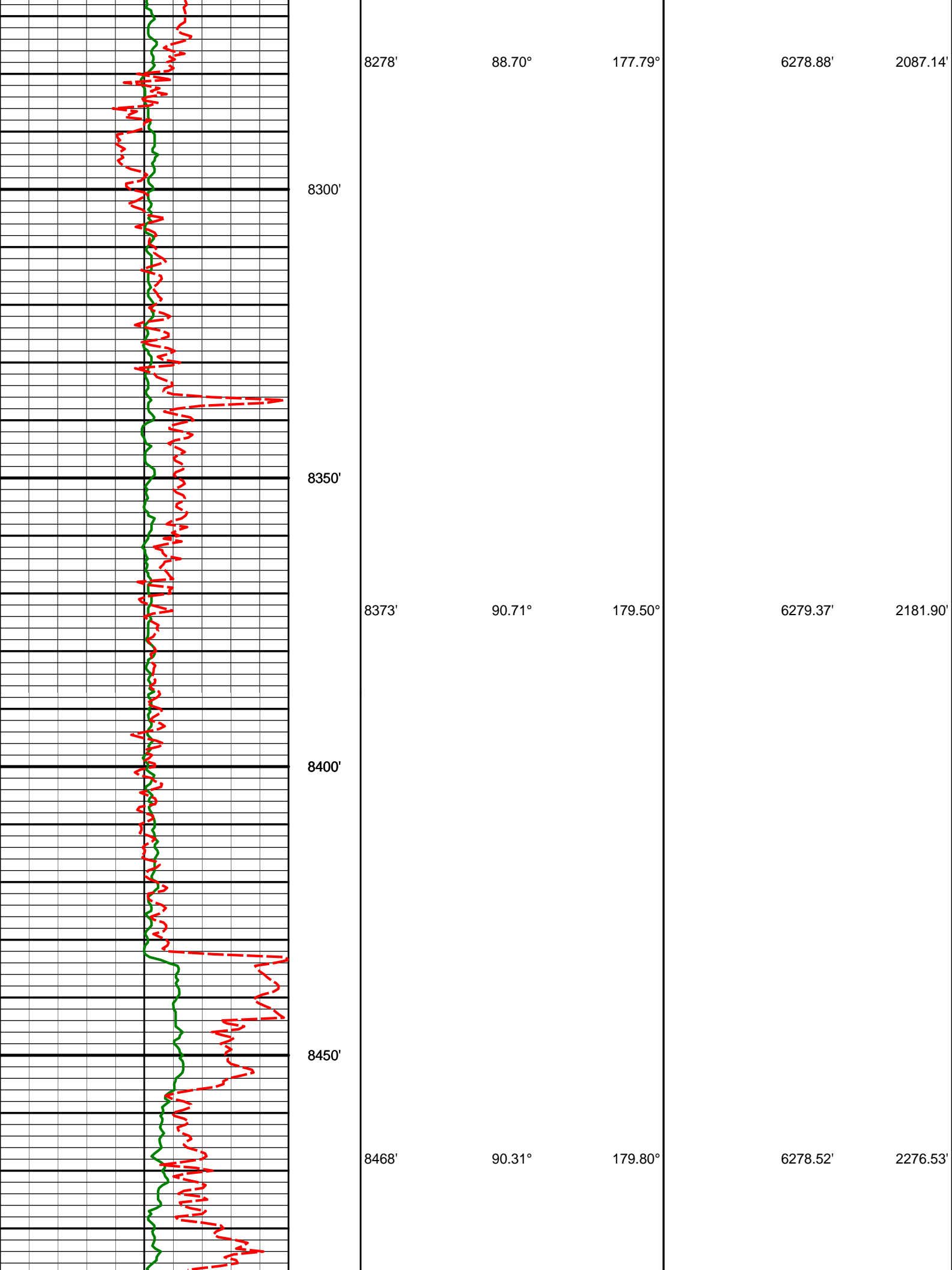


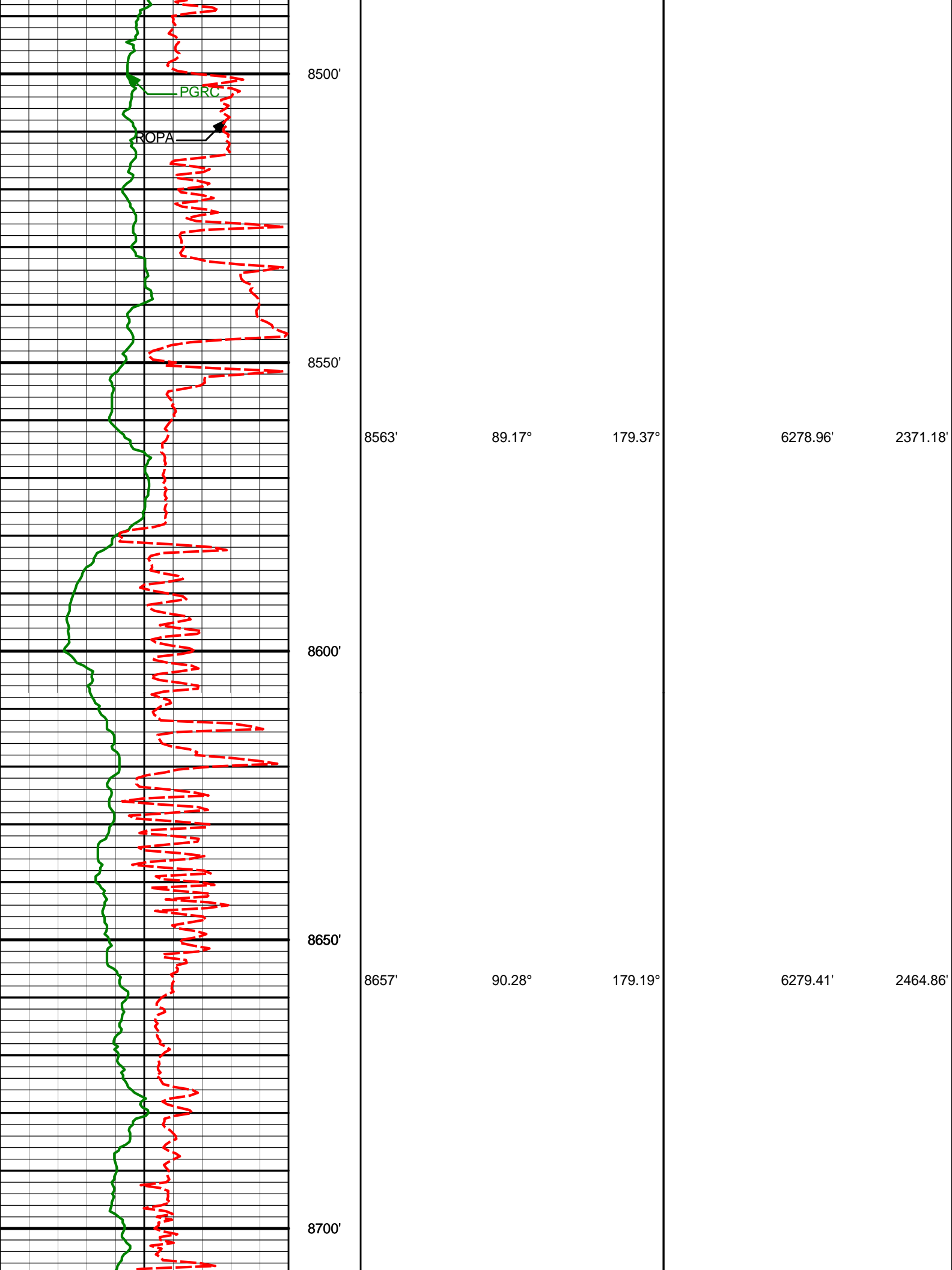


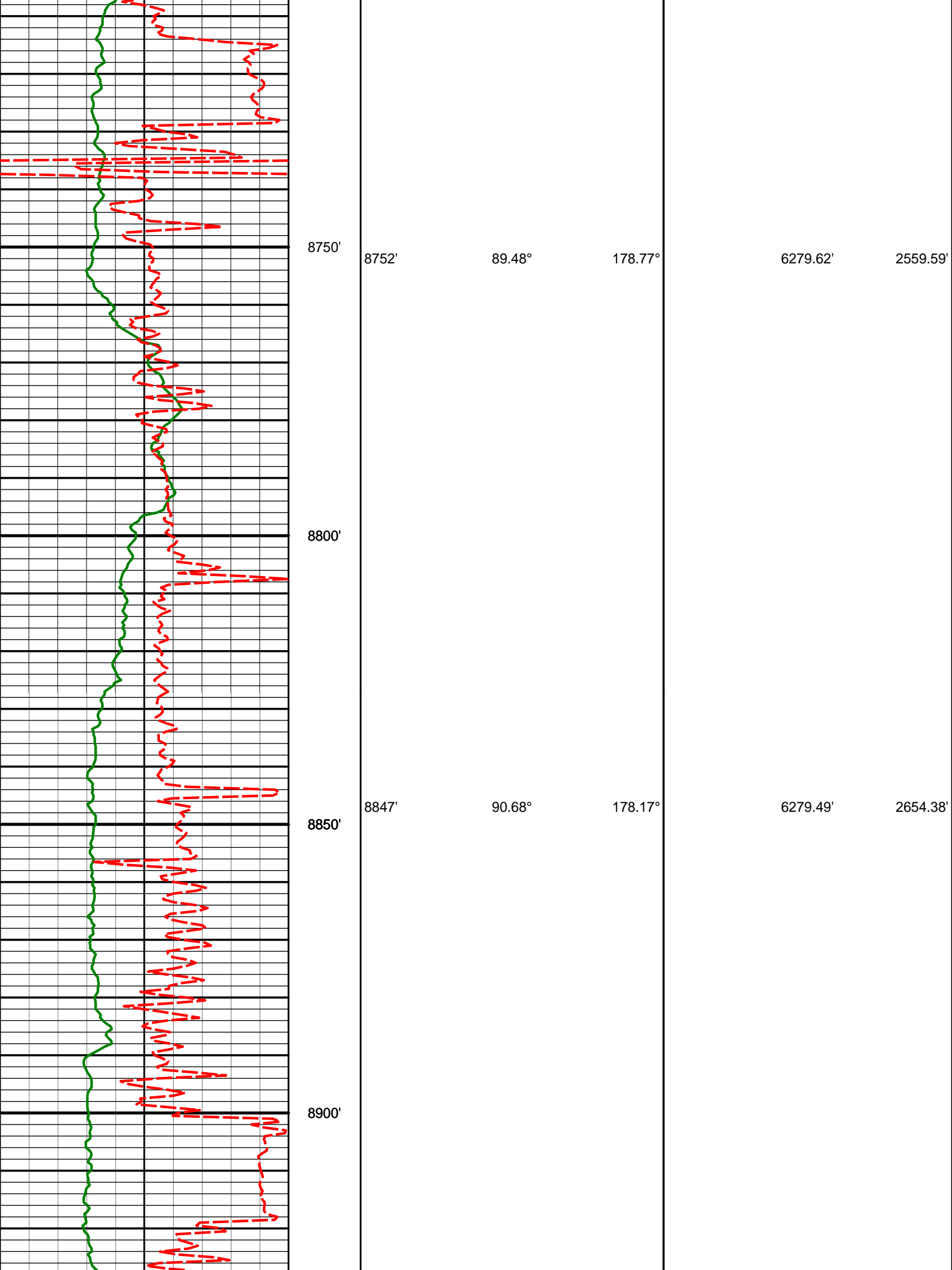


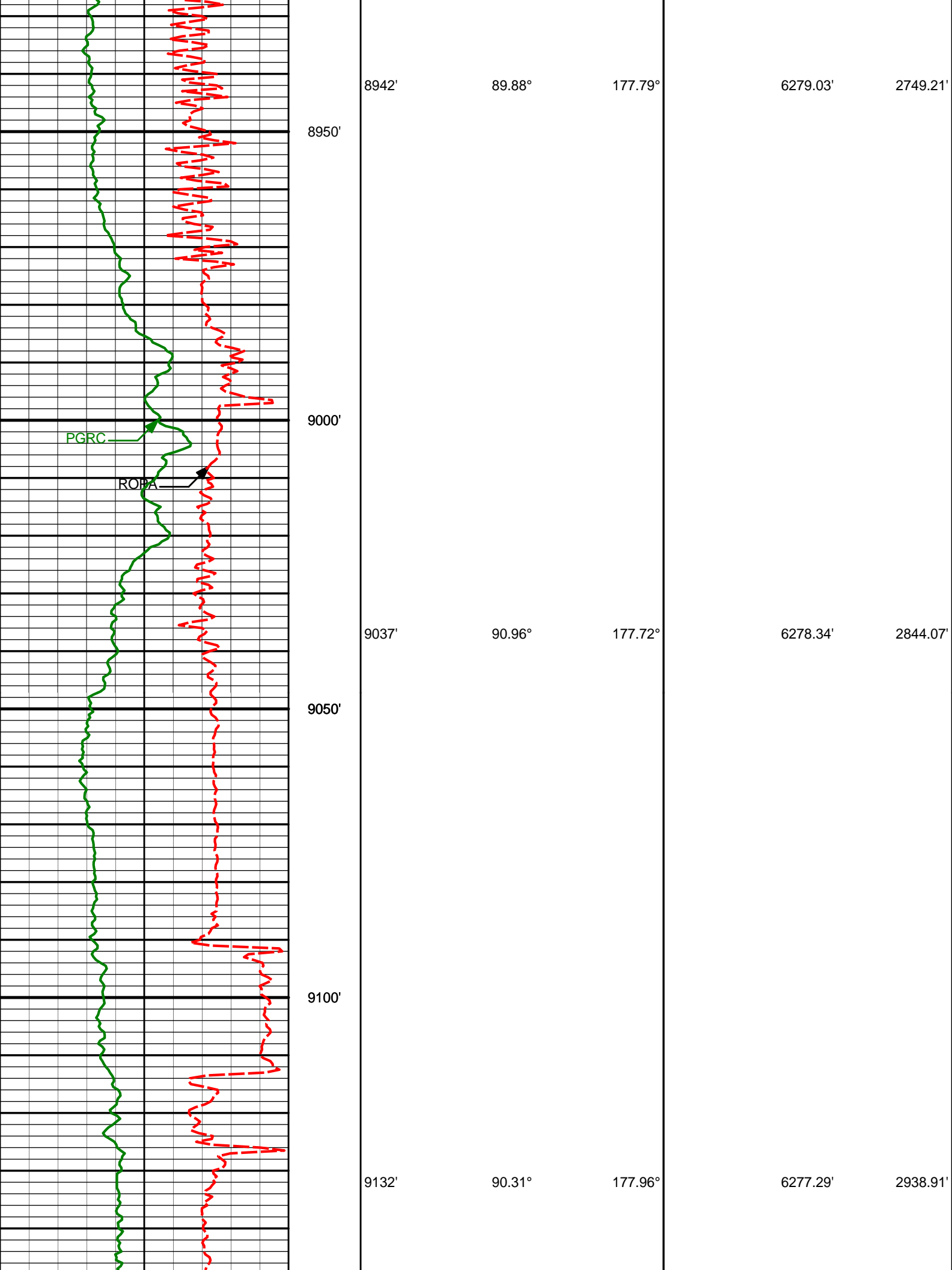


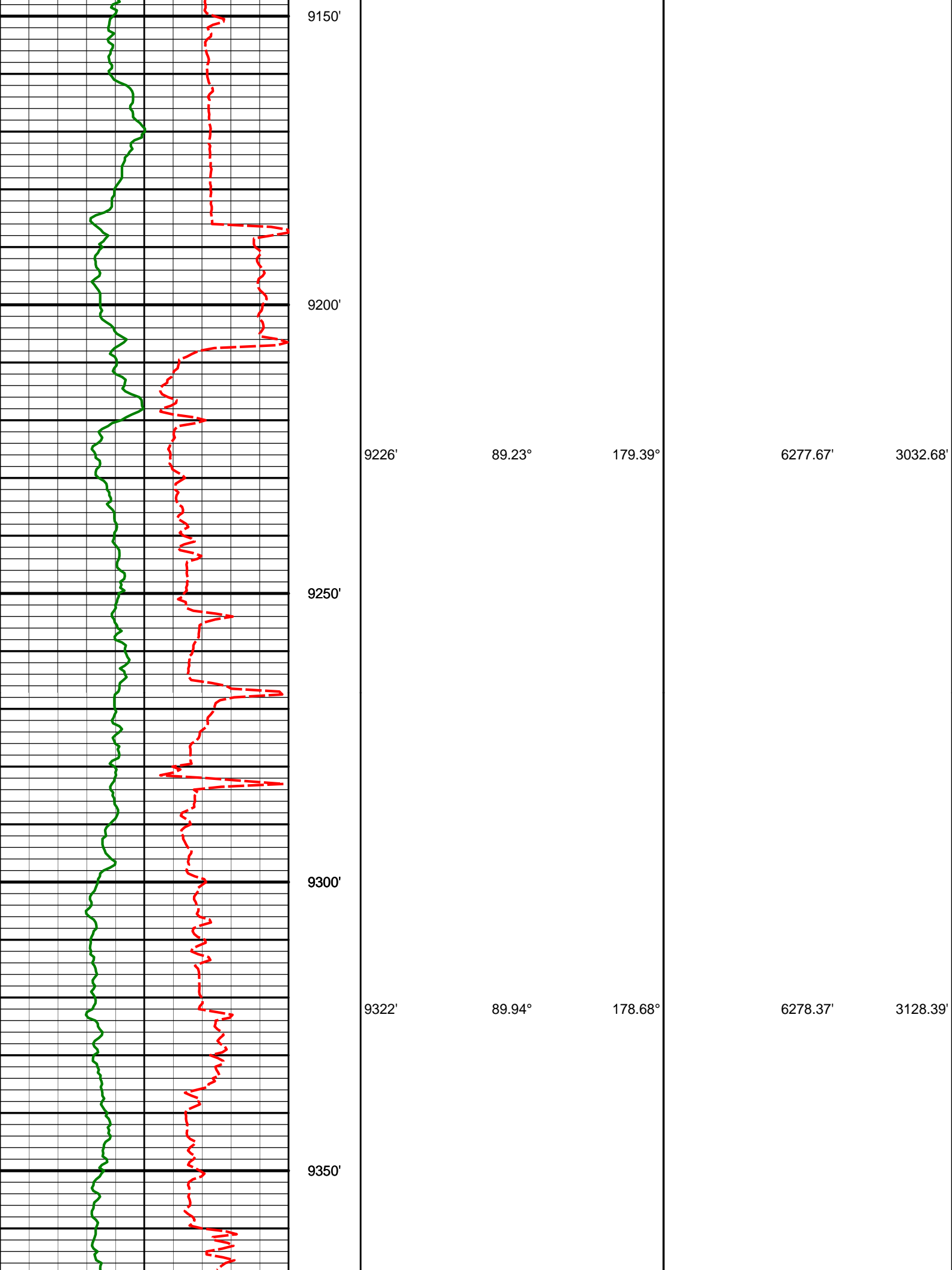


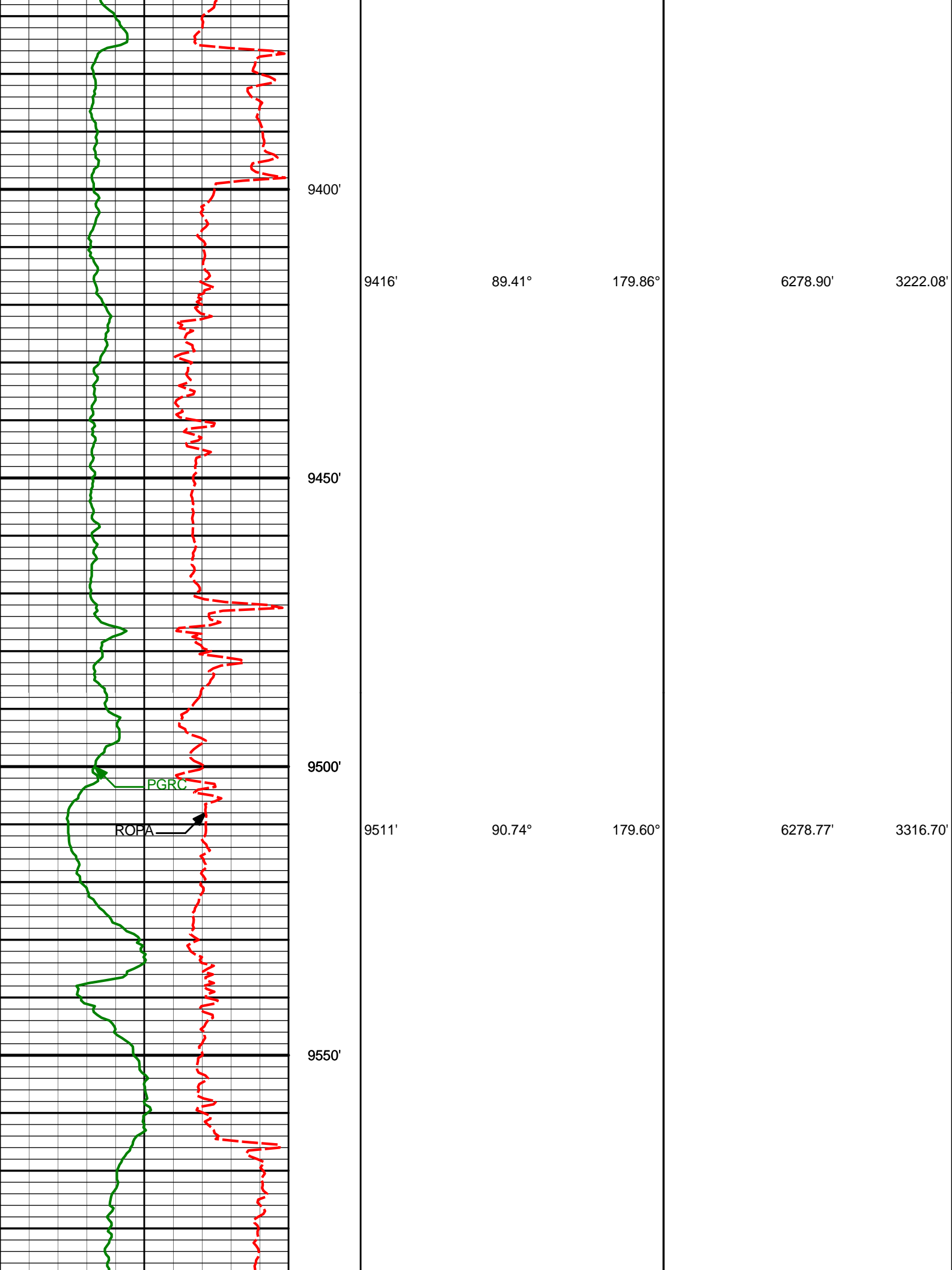


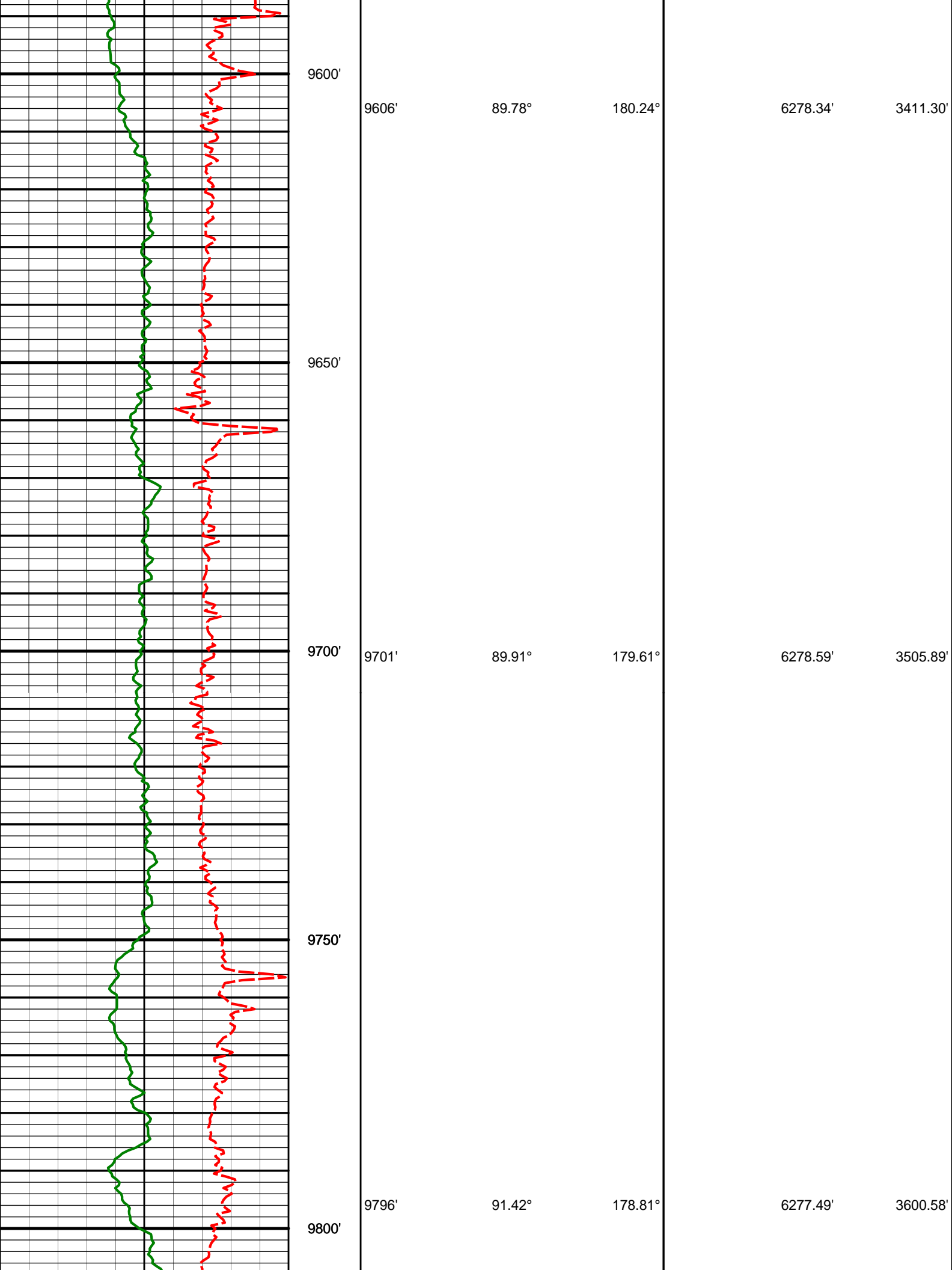


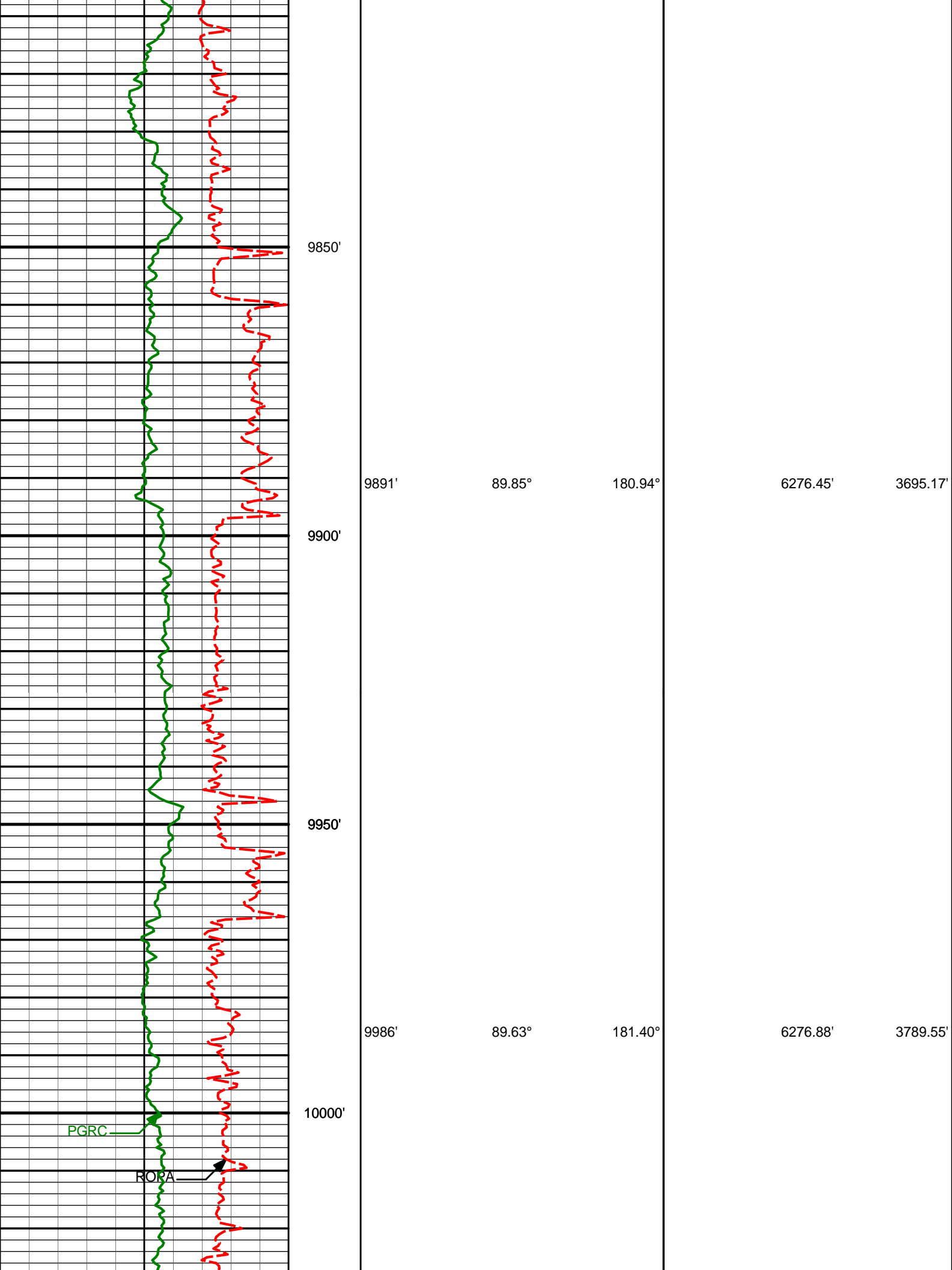


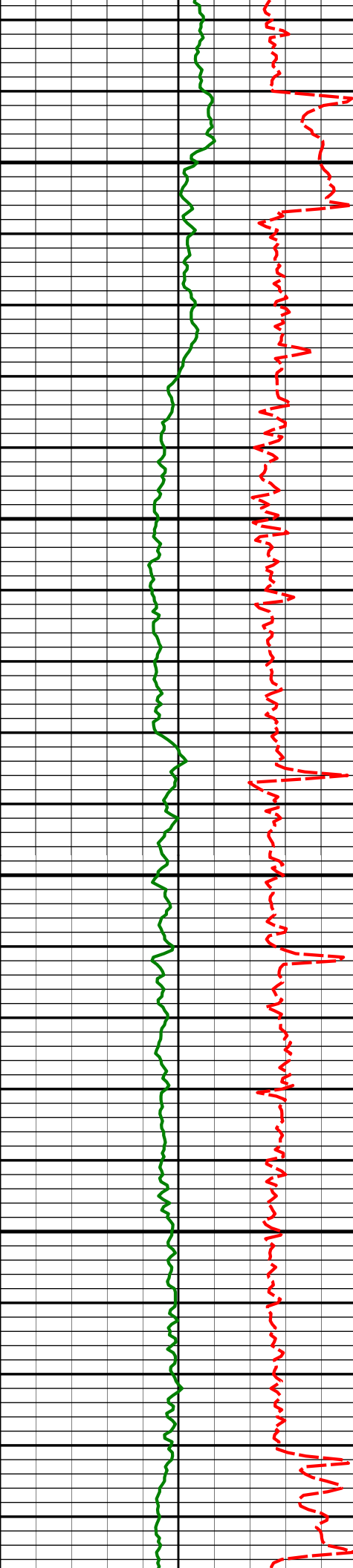












10050'

10081'

89.17°

181.27°

6277.88'

3883.90'

10100'

10150'

10176'

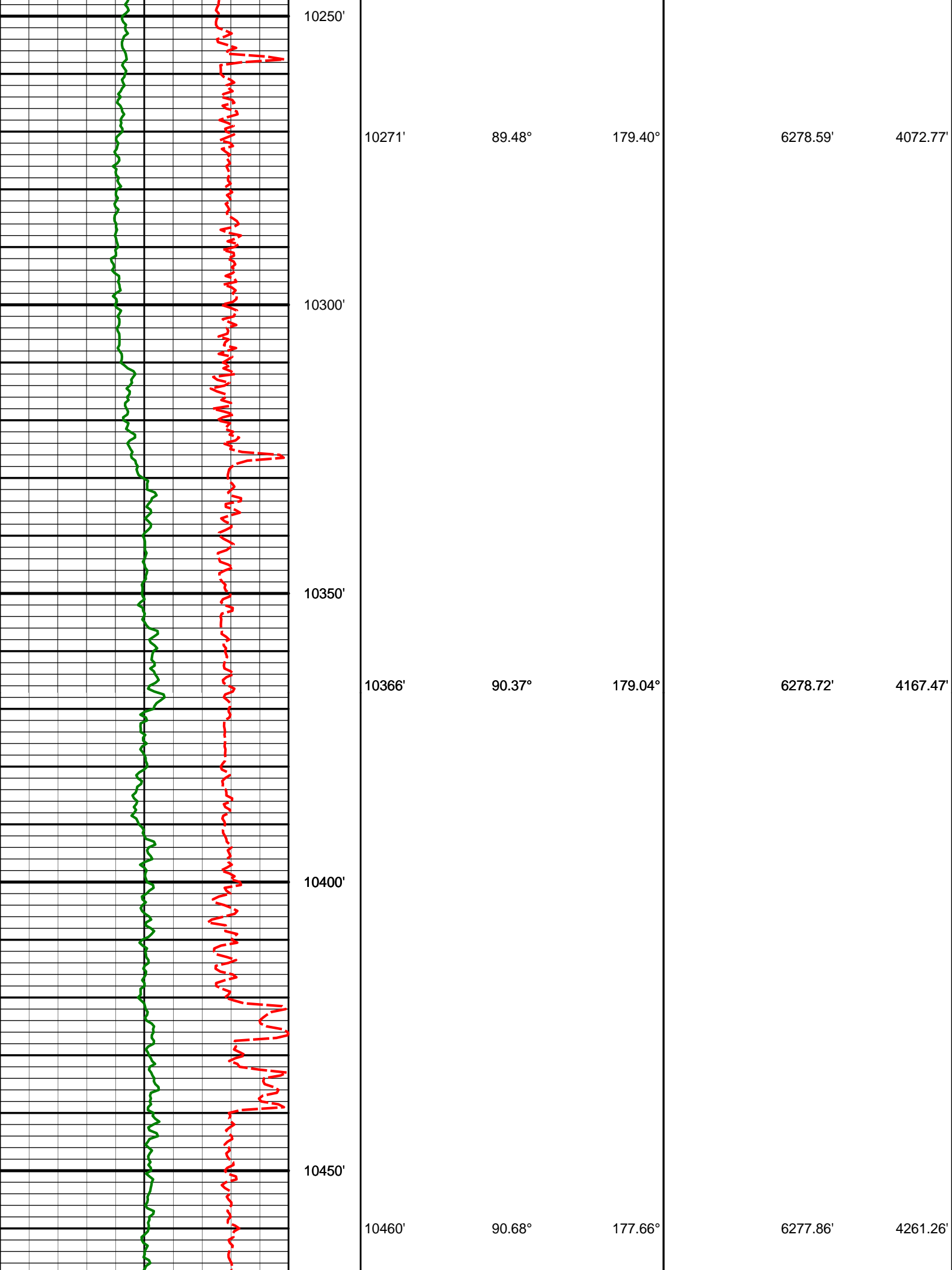
90.25°

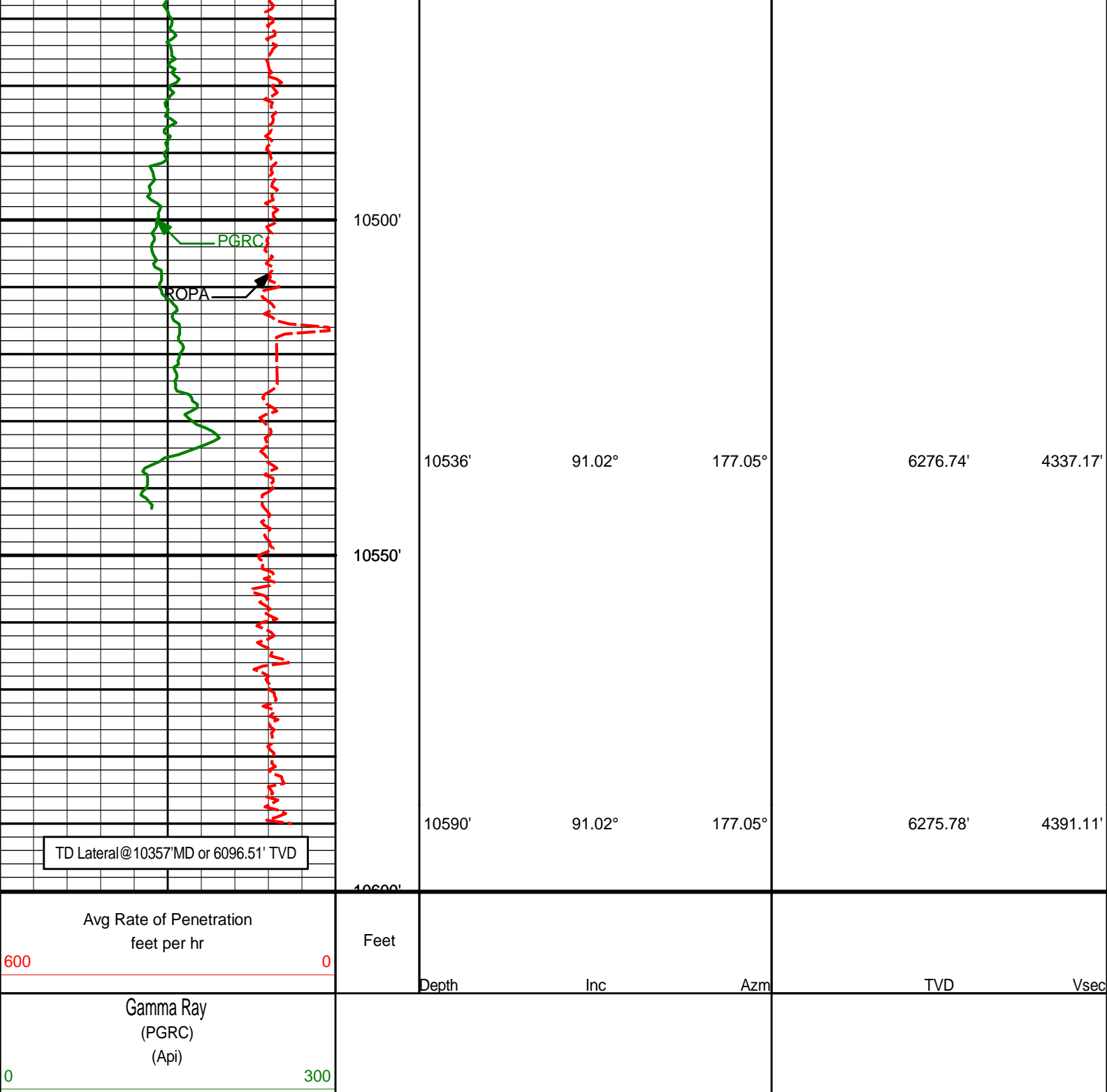
181.35°

6278.36'

3978.25'

10200'





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DIRECTIONAL SURVEY REPORT

Noble Energy
 Ptasnik Federal LC19-74HN
 Wattenberg
 Weld Colorado
 USA
 CA-XX-0900067303

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
762.00	0.00	0.00	762.00	0.00 N	0.00 E	0.00	TIE-IN

782.00	0.00	0.00	782.00	0.00 N	0.00 E	0.00	0.00
825.00	1.27	198.29	824.99	0.66 S	0.22 W	0.64	2.02
1104.00	1.23	172.88	1103.93	6.57 S	0.82 W	6.46	0.20
1383.00	0.93	143.00	1382.88	11.33 S	0.91 E	11.37	0.22
1666.00	0.65	136.70	1665.86	14.33 S	3.39 E	14.58	0.10
1951.00	0.73	140.80	1950.84	16.91 S	5.64 E	17.37	0.03
2046.00	2.07	91.59	2045.81	17.43 S	7.74 E	18.08	1.77
2141.00	3.50	65.08	2140.70	16.26 S	12.09 E	17.32	1.98
2236.00	6.78	63.93	2235.30	12.57 S	19.75 E	14.36	3.45
2331.00	8.78	61.11	2329.42	6.61 S	31.13 E	9.49	2.15
2426.00	11.56	60.45	2422.92	1.60 N	45.77 E	2.69	2.93
2521.00	12.94	60.78	2515.75	11.49 N	63.34 E	-5.52	1.46
2616.00	14.98	58.16	2607.94	23.16 N	83.06 E	-15.30	2.24
2806.00	14.28	55.16	2791.79	49.50 N	123.15 E	-37.77	0.54
3091.00	14.43	51.59	3067.89	91.64 N	179.83 E	-74.44	0.31
3281.00	12.46	55.41	3252.68	117.98 N	215.26 E	-97.36	1.14
3471.00	8.63	50.82	3439.44	138.63 N	243.19 E	-115.31	2.06
3661.00	10.23	54.16	3626.87	157.52 N	267.92 E	-131.80	0.89
3850.00	11.60	52.61	3812.45	178.88 N	296.62 E	-150.39	0.74
3946.00	9.90	57.08	3906.76	189.23 N	311.22 E	-159.33	1.97
4041.00	6.63	44.61	4000.77	197.57 N	321.94 E	-166.64	3.91
4135.00	4.41	42.89	4094.32	204.08 N	328.21 E	-172.53	2.37
4230.00	3.24	42.09	4189.11	208.75 N	332.49 E	-176.78	1.24
4325.00	0.90	43.69	4284.04	211.28 N	334.80 E	-179.08	2.46
4515.00	1.17	104.32	4474.02	211.87 N	337.71 E	-179.40	0.56
4706.00	1.97	40.78	4664.96	213.87 N	341.75 E	-181.01	0.94
4896.00	1.02	41.00	4854.89	217.62 N	344.99 E	-184.44	0.50
4991.00	1.76	242.37	4949.88	217.58 N	344.25 E	-184.47	2.88
5181.00	0.18	255.06	5139.84	216.15 N	341.36 E	-183.31	0.83
5371.00	1.09	37.19	5329.83	217.51 N	342.16 E	-184.60	0.66
5485.00	0.42	18.57	5443.82	218.77 N	342.95 E	-185.78	0.62
5552.00	0.92	22.82	5510.82	219.50 N	343.24 E	-186.48	0.76
5647.00	5.14	169.14	5605.71	216.02 N	344.34 E	-182.91	6.25
5694.00	8.36	165.07	5652.37	210.65 N	345.62 E	-177.44	6.91
5742.00	11.96	168.38	5699.61	202.41 N	347.52 E	-169.06	7.59
5789.00	16.27	162.59	5745.19	191.35 N	350.47 E	-157.78	9.64
5837.00	20.19	165.22	5790.77	176.92 N	354.60 E	-143.03	8.34
5932.00	27.67	171.83	5877.56	139.18 N	361.93 E	-104.76	8.36
6027.00	34.86	178.13	5958.74	90.14 N	365.95 E	-55.56	8.30
6122.00	43.50	179.49	6032.31	30.20 N	367.13 E	4.23	9.14
6169.00	48.61	178.43	6064.92	3.63 S	367.75 E	37.96	10.99
6217.00	53.66	178.91	6095.03	40.98 S	368.61 E	75.23	10.56
6264.00	56.49	177.76	6121.93	79.49 S	369.74 E	113.68	6.34
6312.00	58.80	177.67	6147.62	120.01 S	371.36 E	154.17	4.82
6359.00	60.85	177.90	6171.24	160.60 S	372.93 E	194.74	4.37
6407.00	63.13	178.69	6193.78	202.96 S	374.19 E	237.03	4.98
6454.00	66.57	179.17	6213.75	245.49 S	374.98 E	279.45	7.38
6502.00	70.56	181.09	6231.29	290.16 S	374.87 E	323.91	9.10
6549.00	74.84	180.61	6245.26	335.02 S	374.20 E	368.51	9.17
6597.00	78.18	180.43	6256.46	381.69 S	373.78 E	414.93	6.96
6621.00	80.18	180.96	6260.96	405.26 S	373.49 E	438.37	8.62
6758.00	86.80	181.80	6276.50	541.25 S	370.21 E	573.47	4.87
6853.00	89.14	181.46	6279.87	636.15 S	367.51 E	667.70	2.49
6948.00	89.88	180.71	6280.69	731.13 S	365.71 E	762.09	1.12
7043.00	90.34	180.43	6280.51	826.12 S	364.77 E	856.58	0.57
7138.00	89.60	179.91	6280.56	921.12 S	364.49 E	951.14	0.95
7233.00	91.36	180.11	6279.77	1016.11 S	364.48 E	1045.72	1.86
7329.00	89.44	180.38	6279.10	1112.11 S	364.07 E	1141.25	2.01
7423.00	88.27	179.79	6280.97	1206.09 S	363.93 E	1234.81	1.40
7518.00	89.97	179.61	6282.43	1301.07 S	364.43 E	1329.42	1.80
7613.00	91.08	179.43	6281.56	1396.06 S	365.22 E	1424.07	1.18
7708.00	90.03	178.96	6280.64	1491.05 S	366.55 E	1518.77	1.21
7803.00	89.88	178.85	6280.72	1586.03 S	368.36 E	1613.50	0.20
7898.00	90.00	179.12	6280.82	1681.01 S	370.04 E	1708.23	0.32
7993.00	90.71	179.39	6280.23	1776.00 S	371.28 E	1802.92	0.80
8088.00	90.15	178.83	6279.52	1870.99 S	372.76 E	1897.63	0.83
8183.00	90.95	179.05	6278.60	1965.97 S	374.52 E	1992.35	0.87
8278.00	88.70	177.79	6278.88	2060.92 S	377.14 E	2087.14	2.71
8373.00	90.71	179.50	6279.37	2155.88 S	379.39 E	2181.90	2.77
8468.00	90.31	179.80	6278.52	2250.88 S	379.97 E	2276.53	0.53
8563.00	89.17	179.37	6278.96	2345.87 S	380.66 E	2371.18	1.28
8657.00	90.28	179.19	6279.41	2439.86 S	381.84 E	2464.86	1.19
8752.00	89.48	178.77	6279.62	2534.85 S	383.53 E	2559.59	0.95
8847.00	90.68	178.17	6279.49	2629.81 S	386.07 E	2654.38	1.42
8942.00	89.88	177.79	6279.03	2724.75 S	389.42 E	2749.21	0.93

9037.00	90.96	177.72	6278.34	2819.67 S	393.14 E	2844.07	1.14
9132.00	90.31	177.96	6277.29	2914.60 S	396.72 E	2938.91	0.73
9226.00	89.23	179.39	6277.67	3008.57 S	398.90 E	3032.68	1.91
9322.00	89.94	178.68	6278.37	3104.55 S	400.51 E	3128.39	1.04
9416.00	89.41	179.86	6278.90	3198.54 S	401.70 E	3222.08	1.37
9511.00	90.74	179.60	6278.77	3293.54 S	402.15 E	3316.70	1.42
9606.00	89.78	180.24	6278.34	3388.54 S	402.28 E	3411.30	1.21
9701.00	89.91	179.61	6278.59	3483.53 S	402.40 E	3505.89	0.67
9796.00	91.42	178.81	6277.49	3578.52 S	403.71 E	3600.58	1.80
9891.00	89.85	180.94	6276.45	3673.50 S	403.91 E	3695.17	2.79
9986.00	89.63	181.40	6276.88	3768.48 S	401.97 E	3789.55	0.53
10081.00	89.17	181.27	6277.88	3863.45 S	399.76 E	3883.90	0.50
10176.00	90.25	181.35	6278.36	3958.42 S	397.59 E	3978.25	1.14
10271.00	89.48	179.40	6278.59	4053.41 S	396.97 E	4072.77	2.20
10366.00	90.37	179.04	6278.72	4148.40 S	398.26 E	4167.47	1.02
10460.00	90.68	177.66	6277.86	4242.36 S	400.97 E	4261.26	1.50
10536.00	91.02	177.05	6276.74	4318.27 S	404.48 E	4337.17	0.92
10590.00	91.02	177.05	6275.78	4372.19 S	407.26 E	4391.11	0.01

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 174.64 DEGREES (GRID)
A TOTAL CORRECTION OF 7.38 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10590.00 FEET
IS 4391.11 FEET ALONG 174.68 DEGREES (GRID)**

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